

CLAIMS

- 1 1. A method of incorporating a nanostructured chemical into a fluoropolymer, comprising
2 the step of compounding a nanostructured chemical into the polymer.
- 1 2. A method according to claim 1, wherein a mix of different nanostructured chemicals is
2 compounded into the polymer.
- 1 3. A method according to claim 1, wherein the fluoropolymer is in a physical state selected
2 from the group consisting of oils, amorphous, semicrystalline, crystalline, elastomeric and
3 rubber.
- 1 4. A method according to claim 1, wherein the fluoropolymer contains a chemical sequence
2 and related polymer microstructure.
- 1 5. A method according to claim 1, wherein the polymer is a polymer coil, a polymer
2 domain, a polymer chain, a polymer segment, or mixtures thereof.
- 1 6. A method according to claim 1, wherein the nanostructured chemical reinforces the
2 fluoropolymer at a molecular level.
- 1 7. A method according to claim 1, wherein the compounding is nonreactive.

- 1 8. A method according to claim 1, wherein the compounding is reactive.
- 1 9. A method according to claim 1, wherein a physical property of the fluoropolymer is
2 improved as a result of incorporating the nanostructured chemical into the polymer.
- 1 10. A method according to claim 9, wherein the physical property comprises a member
2 selected from the group consisting of adhesion to a polymeric surface, adhesion to a
3 composite surface, adhesion to a metal surface, water repellency, density, low dielectric
4 constant, thermal conductivity, glass transition, viscosity, melt transition, storage
5 modulus, relaxation, stress transfer, abrasion resistance, fire resistance, biological
6 compatibility, gas permeability, porosity, and optical quality.
- 1 11. A method according to claim 1, wherein the compounding step is accomplished by
2 blending the nanostructured chemical into the polymer.
- 1 12. A method according to claim 1, wherein the compounding step is accomplished by a
2 blending process selected from the group consisting of melt blending, dry blending, and
3 solution blending.
- 1 13. A method according to claim 1, wherein the nanostructured chemical functions as a
2 plasticizer.
- 1 14. A method according to claim 1, wherein the nanostructured chemical functions as a filler.

- 1 15. A method according to claim 1, wherein the nanostructured chemical is selectively
2 compounded into the polymer such that the nanostructured chemical is incorporated into
3 a predetermined region within the polymer.
- 1 16. A method of controlling the molecular motion of a polymer, comprising compounding a
2 nanostructured chemical into the polymer.
- 1 17. A method according to claim 16, wherein a time dependent property is enhanced as a
2 result of compounding the nanostructured chemical into the polymer.
- 1 18. A method according to claim 17, wherein the time dependent property is selected from
2 the group consisting of T_g , HDT, modulus, creep, set, permeability, erosion resistance,
3 abrasion resistance.
- 1 19. A method of reinforcing a selected region of a polymer, the method comprising:
2 compounding a nanostructured chemical with chemical properties compatible with the
3 selected region of the polymer.
- 1 22. A fluoropolymer composition produced by a method according to claim 19.